

**ARC Centre of Excellence for Engineered Quantum Systems
2014 Annual Workshop Program**

Crowne Plaza
Coogee Bay, Sydney

Wednesday 3 December 2014

6:30pm – 9:00pm Workshop Opening Dinner – Ocean View Court

Thursday 4 December 2014

6:30 – 8:30 Breakfast – Blue Salt Restaurant

8:30 – 8:50 Registration -Oceanic Ballroom Foyer

8:50 – 9:00 Welcome and Introduction
Professor Gerard Milburn - University of Queensland

Session 1 Chairman: Professor Gerard Milburn

9:00 – 9:30 *Invited Speaker*
Simulating an Interacting Quantum Gas with Superconducting Circuits
Professor Andreas Wallraff - ETH Zurich

9:30 – 9:50 Testing Quantum Contextuality with Superconducting Circuits
Dr Pascal Macha – The University of Queensland

9:50 - 10:10 Parity transition in 1D Josephson arrays
Dr Karin Cedergren – University of New South Wales

10:10 – 10:40 *Invited Speaker*
Manipulating mechanical and electrical quanta with parametric circuits
Dr Raymond Simmonds – NIST, Boulder

10.40 – 11:00 Morning Tea – Oceanic Ballroom pre function foyer

Session 2 Chairman: Dr Thomas Volz

11:00– 11:30 *Invited Speaker*
The Superconducting Flux Qubit Revisited
Professor John Clarke, University of California, Berkeley

11:30– 11:50 Two and a Half Methods to Achieve Strong Coupling with Spins in Solids at
Microwave Frequencies
Dr Maxim Goryachev – University of Western Australia

11:50 – 12:10 Novel Quantum Phases in Triangular J1-J2 Heisenberg Magnets on a Cylinder
Seyed N. Saadatmand - University of Queensland

12:10 – 12:30 *Observation of resonant optical forces in optically trapped nanodiamonds*
Dr Carlo Bradac - Macquarie University

12:30 – 2:00 *Lunch – Blue Salt Restaurant*

Session 3 Chairman: Professor Mike Tobar

2:00 – 2:30 **Invited Speaker**
Proposal for Monitoring and Engineering the Position States of Atomic Arrays in a One-Dimensional Waveguide
Professor Valerio Scarani – National University of Singapore

2:30 – 2:50 Non-Abelian Anyons for Quantum Codes: a Phenomenological Model
Simon Burton - University of Sydney

2:50 – 3:10 Strong Converse Bounds for Quantum Communication
Dr Marco Tomamichel- University of Sydney

3:10 – 3:30 High-Precision Quantum Photonic Measurements
Martin Ringbauer - University of Queensland

3:30 – 4:00 *Afternoon Tea - Oceanic Ballroom pre function foyer*

Session 4 Chairman: Professor Andrew White

4:00 – 5:00 **Three Minute EQuS Poster Presentations, see schedule**

5:00 – 7:00 Poster Judging & General Discussion
Complimentary Refreshments Served, Oceanic Ballroom

Friday 5 December 2014

6.30 – 8.30 *Breakfast – Blue Salt Restaurant*

Session 5 Chairman: Associate Professor Warwick Bowen

9:00 – 9:30 **Invited Speaker**
Quantum Computations on a Topologically Encoded Qubit
Professor Rainer Blatt- University of Innsbruck

9:30 – 9:50 Superfluid Helium Optomechanics
Dr David McAuslan - University of Queensland

- 9:50 – 10:10 Quantum control of single photon states via a mechanical resonator
Sahar Basiri Esfahani- University of Queensland
- 10:10 – 10:30 Deterministic Creation of Macroscopic Cat States using Optomechanics
Daniel Lombardo – Macquarie University

10:30 – 11:00 *Morning Tea - Oceanic Ballroom pre function foyer*

Session 6 Chairman: Professor Halina Rubinsztein-Dunlop

- 11:00 – 11:20 Experimental Noise Filtering by Quantum Control
Harrison Ball - University of Sydney
- 11:20 – 11:40 Dual Component 87Rb and 41K Bose-Einstein condensates in configurable optical potentials
Dr Tyler Neely - University of Queensland
- 11:40 – 12:00 Progress in Simulation of Anyonic Systems
Dr Robert Pfeifer – Macquarie University
- 12:00 – 12:20 Characterizing spatio-temporal correlations with Hong-Ou-Mandel dips
Alexander Buese – Macquarie University
- 12:20 – 12:40 Taming non-completely positive maps
Associate Professor Alexei Gilchrist – Macquarie University

12:40 – 1:40 *Lunch – Blue Salt Restaurant*

Session 7 Private Meeting

- 1:40 – 3.10 Discussion: The future of Quantum Technology
(Note: attendance to this meeting is by CI or COO invitation only)
- 3.10 – 3.30 *All workshop delegates reconvene for Afternoon Tea – Oceanic Ballroom pre function foyer***

Session 8 Chairman: Professor Jason Twamley

- 3:30 – 3:50 Classical Weak Value of Gaussian states
Angela Karanjai- University of Sydney
- 3:50 – 4:20 ***Invited Speaker***
Negative Quasi-Probability, Contextuality and the Power of Quantum Computation
Professor Joseph Emerson
- 4:20 – 4:30 Closing- including announcement of Poster prize winners